

SMUT CONTROL IN OATS

DOMINION-PROVINCIAL YOUTH TRAINING



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SMUT CONTROL IN OATS

By F. J. GREANEY*

INTRODUCTION

Oats are attacked by two smut diseases, namely, Covered Smut and Loose Smut. Both of these smuts are prevalent and destructive on oats in Western Canada. Covered Smut is more common in the open prairie regions, while Loose Smut predominates in the parkland or more humid areas. The smuts of oats can easily be recognized. In both smuts the heads or panicles of infected plants are destroyed and displaced by dark, powdery masses of smut spores.

From the standpoint of control it is fortunate that both the oat smuts are carried over from one season to the next on or near the surface of the seed. Consequently both of these smuts can be easily and effectively controlled by properly applying a suitable seed disinfectant to the surface of the seed.

The main object of this circular is to give farmers, grain buyers and others the latest and most reliable information available concerning the control of smut in oats by seed treatment.

PREVALENCE AND IMPORTANCE

Field surveys and extensive laboratory tests on seed samples show that the oat smuts are generally prevalent throughout Western Canada. Bad attacks occur in certain districts and fields every year. It is no exaggeration to say that they are responsible for the loss of hundreds of thousands of bushels of oats annually.

To emphasize how widespread the oat smuts are in Western Canada, the results of smut tests made annually by the Line Elevators Farm Service on hundreds of farmers' seed samples of oats from the crops of 1948 to 1952, and from all over the Prairie Provinces, are given in the accompanying table.

*Director, Line Elevators Farm Service, Winnipeg, Manitoba.

Smut in Farmers' Seed Samples of Oats—1948-52

Year seed produced	No. of samples tested	Percentage of samples carrying smut
1948	2,405	85.9
1949	2,936	81.1
1950	5,331	73.5
1951	1,106	84.4
1952	1,655	87.4

The above figures show that a very serious oat smut situation exists in the Prairie Provinces. Despite the ease with which the smuts on oats can be prevented, it is discouraging to find that 87 percent of the farm seed stocks of oats from the 1952 crop were contaminated with smut. It is also alarming to find that there has been a gradual increase in the incidence of smut since 1950. Obviously far too many farmers in Western Canada are neglecting to treat their oats for smut control, a neglect that is costing them a great deal of money each year.

It is reliably estimated that the average annual loss in recent years from the smut diseases of oats in the Prairie Provinces has amounted to not less than 2 percent of the crop, or about 3 million dollars. In these days of high crop production costs this is one extra cost or tax that western oat growers can and should get rid of. Seed treatment would eliminate most of this loss if it was applied diligently everywhere.

CAUSE AND IDENTIFICATION

The smut diseases of oats—Loose Smut and Covered Smut—are caused by two different but closely related fungus parasites. Accurate identification of these two smuts in the field is often difficult because "looseness," or the extent to which the chaff is affected, varies widely. In Loose Smut of oats both the chaff and the kernels are usually completely destroyed. (See photograph on cover page). In Covered Smut, on the other hand, the chaff is only partly destroyed. (See Figure 1).

Owing to the "loose" nature of the smutted heads, the spores (seeds) of Loose Smut are exposed more or less directly to the wind as soon as they emerge from the "boot". Consequently the bulk of them are dispersed early in the season, in fact, at a time when a large part of the crop is in flower. Many of the spores find their way by wind or other means on to the open flowers and eventually come in contact with the developing seed, and contaminate it. In the case of Covered



Figure 1. Covered Smut of Oats.
Healthy panicle in centre.

Smut the spore masses are better protected than are those of Loose Smut and therefore remain more or less intact until the crop ripens. The spores are then scattered over the grain at the time the grain is threshed. When oats, contaminated with either Loose Smut or Covered Smut are sown, infection of the young sprouts or seedlings takes place, so that, when the crop comes into head, the infected plants produce smutted heads, rather than healthy ones. Year after year this cycle of development takes place.

CONTROL

The most effective solution to the oat smut problem lies in the development and use of resistant varieties. Unfortunately, the production of smut-resistant varieties is a long and difficult task. Some of the newer oat varieties, including such varieties as Garry, Fortune and Rodney, possess a great deal of resistance to the oat

smuts and should be grown wherever they are officially recommended. However, the most important commercial varieties of oats now grown in Western Canada are either susceptible or only partially resistant to smut. Owing to this fact it is advisable to treat all seed of oats in order to reduce smut losses. The best advice we can offer to farmers is as follows. *Unless you are satisfied that your oat crop is practically free of smut treat your seed.*

Approved Treatments. It is generally recognized that the organic mercury compounds are the best all-round cereal seed disinfectants available today. The following mercurial seed disinfectants are officially approved for the treatment of oats: Agrox C, Ceresan M, Half-ounce Leytosan, Leytosal C, Panogen and P.M.A.S. These chemicals not only control the smuts of oats but are effective in destroying other seed-borne diseases of oats, particularly seedling blight and seed rot. Besides, they provide a certain amount of protection to the seed and young seedling against certain destructive soil organisms. In other words, the organic mercury compounds act not only as seed disinfectants but also as seed protectants.

Besides the straight organic mercury compounds mentioned above, a number of dual-purpose cereal seed disinfectants, which contain mercury (a fungicide) and Lindane (an insecticide), are now available to control smut and wireworms with one treatment. The dual-purpose compounds now generally recommended are Mergamma C, Leytosan G, and Merlane. These seed disinfectants should be used on oats wherever wireworms as well as smut are to be controlled. In using these dual-purpose chemicals, however, the directions supplied by the manufacturer, particularly with respect to dosage (rate per bushel of seed), should be followed closely. It is important to point out in passing that in order to obtain the best results, seed treated with chemicals containing Lindane should not be planted too deeply. In no case should such seed be sown deeper than 4 inches.

What, When, and How to Treat. To obtain the best results from any seed treatment the seed should be dry, and of good quality. Moreover, it should not be heavily contaminated with smut. If seed of oats is heavily infected with smut it may be advisable to discard it and to replace it with Registered or Certified seed, or any other seed stock that is known to be free or relatively free from smut.

The use of dirty, uncleansed seed is a barrier to success in controlling smut by seed treatment. Be sure and clean your seed before you treat it. Passing the seed through a cleaning mill will not only remove trash and weed seeds but also many of the smut spores.

To obtain proper control of smut and other seed-borne diseases of oats with any approved organic mercury disinfectant *it is important that the seed be treated at least a week in advance of seeding*. Don't plant seed immediately after it has been treated. Furthermore, it is important to apply the right amount of chemical to the seed as an overdose of the disinfectant, or improper mixing of seed and chemical, may reduce seed germination.

Although seed may be treated any time during the Fall or Winter months, the best control of smut in oats is likely to be obtained when the interval between treating and planting does not exceed 12 weeks. Once treated, however, the seed should be stored in a well ventilated, dry place until it is sown.

Most modern organic mercury seed disinfectants may be applied either as dusts, or in the form of a thick paste or slurry, or as concentrated liquids, depending upon the type of seed-treating equipment available. However, no matter what chemical is used nor in what form it is used, a thorough mixing of chemical and seed is essential. It is important that every kernel be evenly coated with the disinfectant.

As deep seeding and warm soil favor smut infection in oats, an oat crop sown late in the Spring is likely to have more smut in it than an

early-sown crop. Consequently it is important that all seed of oats used for late planting be treated for smut control.

Precautions. The organic mercury seed disinfectants are poisonous or toxic. Proper precautions must be exercised in handling them if discomfort or sickness is to be avoided. When treating seed be sure and wear a good respirator and, if at all possible, carry out the seed-treating operation in a well ventilated place, or out of doors. The precautions given by the chemical manufacturer should be strictly observed.

Seed treated with an organic mercury compound is poisonous and must not be sold for human consumption or fed to livestock. According to a recent ruling of the Board of Grain Commissioners for Canada it is a serious criminal offence to deliver treated grain to an elevator. Providing it is properly labelled and stored, treated seed may be held over and used the following year. If possible, however, all surplus stocks of treated seed should be sold as seed, or sown for green feed.

Other Treatments. Besides the mercury-containing compounds a number of other cereal seed disinfectants have appeared on the market in recent years. Most of these new compounds are adapted for specific uses. In this respect it is important to point out that seed disinfectants containing hexachlorobenzene, as represented by Anticarie, Bunt-Cure, Bunt-no-More and No-Bunt, are recommended for the control of bunt of wheat only. They are not effective against the smuts of oats and therefore they should not be used on this crop.

The practice of steeping or sprinkling cereal seeds with formaldehyde (Formalin) for the control of smut is no longer recommended. The disadvantages of the wet formaldehyde treatments can be listed as follows: (1) They are time consuming. (2) Effective treatment with them is difficult. (3) They cannot be applied to seed in advance of seeding. (4) Treatment with formaldehyde is likely to cause rather severe injury to the seed and seedling, and to result in weak, thin field stands. Furthermore, although treatment with formaldehyde is fairly effective against smut, it is not effective against other seed-borne diseases and offers no protection to the seed and young seedlings against soil-borne, disease-producing organisms. On no account should frost-damaged, mechanically-injured, tough, damp, or hulless seed of oats be treated with formaldehyde.

SEED TREATMENT PAYS

Recent provincial seed surveys and extensive laboratory tests on farmers' seed samples show that the smuts of oats are widespread and destructive in Western Canada. Smut is so universally present on the

seed stocks of oats used in the three prairie provinces that it will pay any farmer to treat all his seed of oats each year for smut control. Seed treatment is inexpensive crop insurance. There is no farm practice that will yield as great a return for so small an investment in time, labour and money as seed treatment of oats for smut control.

OTHER IMPORTANT BULLETINS AND CIRCULARS

Published by

LINE ELEVATORS FARM SERVICE

Bulletin No. 2—An Illustrated Guide to Prairie Weeds.

Bulletin No. 3—Water Erosion of Soils in the Prairie Provinces and Its Control.

Bulletin No. 4—Ornamental Shrubs and Small Trees for the Canadian Prairies.

Bulletin No. 5—Field Crop Insects in the Prairie Provinces.

Bulletin No. 6—Growing Small Fruits in the Prairie Provinces.

Circular No. 11—Wild Oat Control by Cultural Methods.

Circular No. 12—Couch Grass Control by Cultural Methods

Circular No. 13—Canada Thistle and Perennial Sow Thistle Control.

Circular No. 14—Trash Cover Prevents Soil Erosion.

Circular No. 16—Smut Control in Wheat.

Circular No. 18—Smut Control in Barley.

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Additional copies of this circular, or of circulars dealing with the control of smut in wheat and barley, can be obtained from local Agents of any of the Line Elevator Companies listed above, or by writing directly to the Line Elevators Farm Service, Winnipeg, or Herald Building, Calgary.